Tele-Operated Mobile Robot for 3D Visual Inspection Utilizing Distributed Operating System Platform

M.S. Hendriyawan Achmad[a], Gigih Priyandoko[b,c], Rosmazi Rosli[b,d] and Mohd Razali Daud[e]

[a]Dept. of Electrical Engg., Universitas Teknologi Yogyakarta, Yogyakarta, Indonesia
Corresponding Author, Email: hendriyawanachmad@uty.ac.id
[b]Faculty of Mech. Engg., Universiti Malaysia Pahang, Pahang, Malaysia
[c]Email: gigih@ump.edu.my
[d]Email: rosmazi@ump.edu.my
[e]Faculty of Electrical & Electronics Engg., Universiti Malaysia Pahang, Pahang, Malaysia
Email: mrazali@ump.edu.my

ABSTRACT

This research examines how humans work with tele-operated unmanned mobile robots to perform interaction to do the inspection in industrial plant area to produce a 3D map for further critical evaluation. This experiment focuses on two parts, the way human-robot doing the remote interactions using robust method and the way robot perceives its surrounding environment as a 3D perspective map. Robot operating system (ROS) as a tool was utilized in the development and implementation of this research which comes up with robust data communication method in the form of messages and topics. RGBD simultaneous localization and mapping (SLAM) performs the visual odometry and mapping function simultaneously to construct 3D map using Kinect sensor. The results showed that the mobile robot-based tele-operated system utilizing RGBD SLAM for 3D inspection task under ROS environment are successful in extending human perspective in term of remote surveillance in the large area of the industrial plant.

KEYWORDS:
Mobile Robot; Human-Robot interaction; Automation; 3D Inspection; Robot operating system; Kinect; RGBD SLAM.

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